



# education

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Department:  
Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 10**

**MATHEMATICS P2**

**2007**

**MARKS: 100**

**TIME: 2 hours**

**This question paper consists of 10 pages and 1 diagram sheet.**

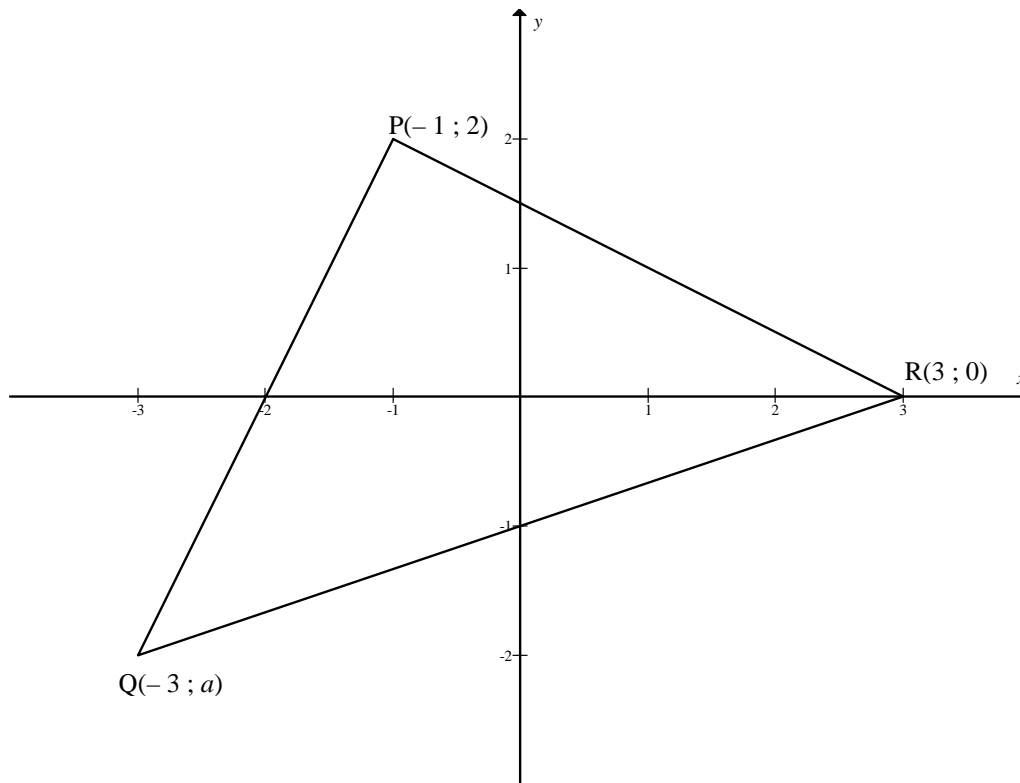
**INSTRUCTIONS AND INFORMATION**

Read the following instructions carefully before answering the questions:

1. This question paper consists of 8 questions. Answer ALL the questions.
2. Show clearly ALL calculations, diagrams, graphs, et cetera which you have used in determining the answers.
3. An approved scientific calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
4. If necessary answers should be rounded off to TWO decimal places, unless stated otherwise.
5. Number the answers correctly according to the numbering system used in this question paper.
6. Diagrams are NOT necessarily drawn to scale.
7. It is in your own interest to write legibly and to present the work neatly.

**QUESTION 1**

$P(-1 ; 2)$ ,  $R(3 ; 0)$  and  $Q(-3 ; a)$  are the vertices of a triangle in the Cartesian plane and  $PQ = PR$ .

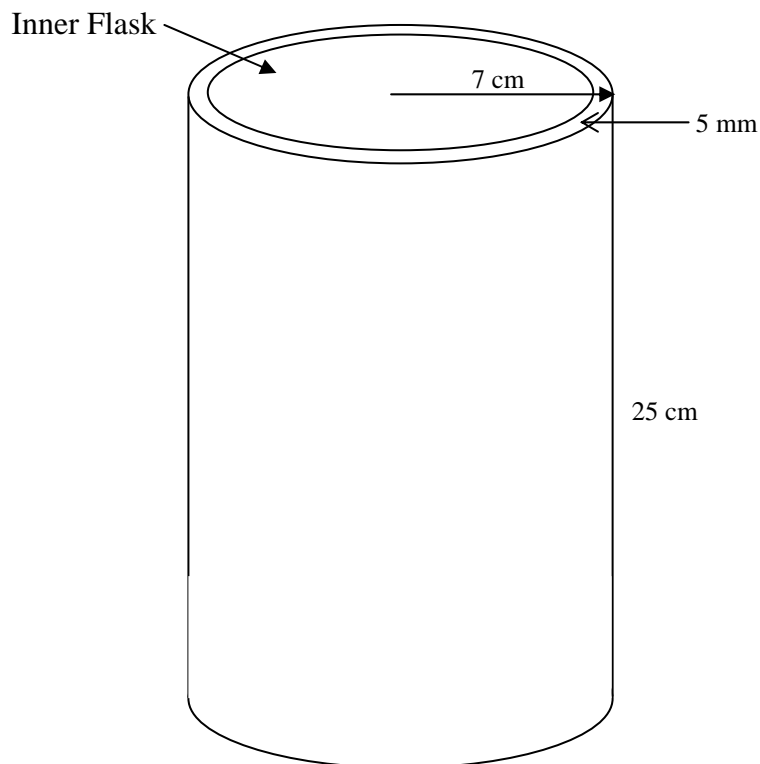


- 1.1 Determine the coordinates of E, the midpoint of PR. (4)
- 1.2 Show that  $a = -2$  if the midpoint of QR is  $(0 ; -1)$  (3)
- 1.3 Determine the gradient of EQ. (3)
- 1.4 Calculate the distance of PQ. (3)
- 1.5 Calculate the distance of QR. (2)
- 1.6 Show that  $\Delta PQR$  is right-angled at P if  $QR = \sqrt{40}$  (4)
- 1.7 Calculate the area of  $\Delta PQR$ . (3)
- 1.8 Write down the ratio of area  $\Delta PQE$  : area  $\Delta PQR$ . (1)

**[23]**

**QUESTION 2**

A cylindrical flask has a diameter of 7 cm. The metal used to make the flask is 5 mm thick.

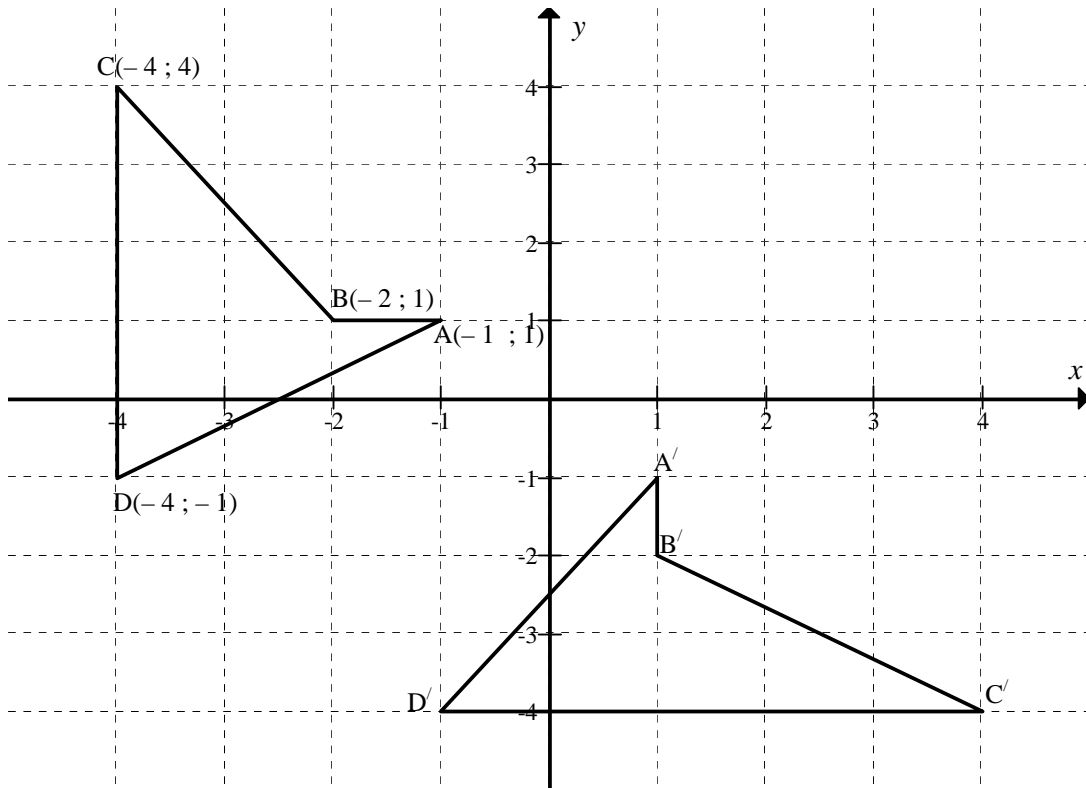


- 2.1 Show that the radius of the inner flask is 3 cm. (1)
- 2.2 Calculate the cross-sectional area of the inner flask. (2)
- 2.3 If the flask is 25 cm tall, calculate the volume of liquid that the flask can hold. (2)
- 2.4 Calculate the surface area of the flask without a lid. (3)
- 2.5 By what factor would the volume of the flask be increased if the radius was doubled? (2)

**[10]**

**QUESTION 3**

The figure below has coordinates A(0 ; 1), B(- 1 ; 1), C(- 3 ; 4) and D(- 3 ; - 1) in a Cartesian plane.

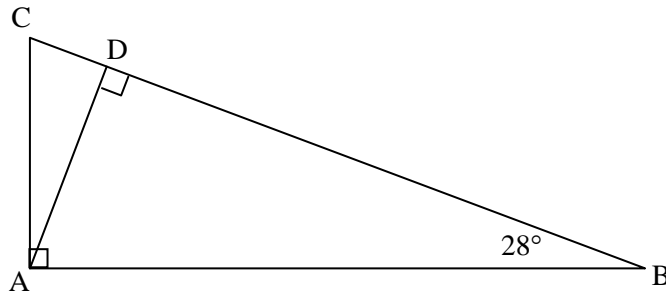


- 3.1 Write down the transformation of ABCD to  $A'B'C'D'$ . (2)
- 3.2 Sketch PQRS, on the attached diagram sheet, if PQRS is the reflection of ABCD in the y-axis. (4)
- 3.3 Write down the coordinates of  $D''$  if ABCD is translated under the rule  $(x ; y) \rightarrow (-x ; y + 3)$  to the quadrilateral  $A''B''C''D''$ . (2)
- 3.4 Describe, in words, the transformation of ABCD if it is transformed under the rule  $(x ; y) \rightarrow (x ; -y)$ . (2)
- 3.5  $A'''(1 ; -3)$  is a vertex of  $A''''B''''C''''D''''$  which is a transformation of ABCD. Write down the mapping that would describe the transformation of ABCD to  $A''''B''''C''''D''''$ . (2)

**[12]**

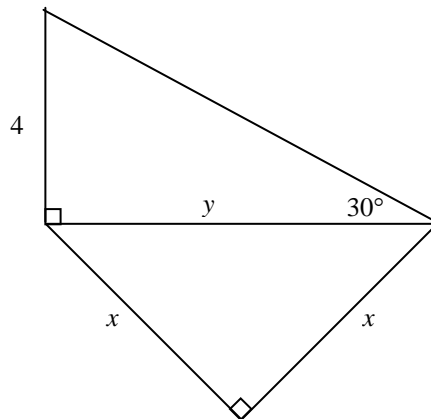
**QUESTION 4**

4.1 Consider the following figure



- 4.1.1 Write down TWO ratios for  $\sin 28^\circ$ . (2)
- 4.1.2 If  $AB = 5,1$  cm, calculate the value of  $BD$ . (3)
- 4.1.3 Write down a trigonometric definition for  $\frac{DC}{AD}$ . (2)

4.2 Consider the following diagram.

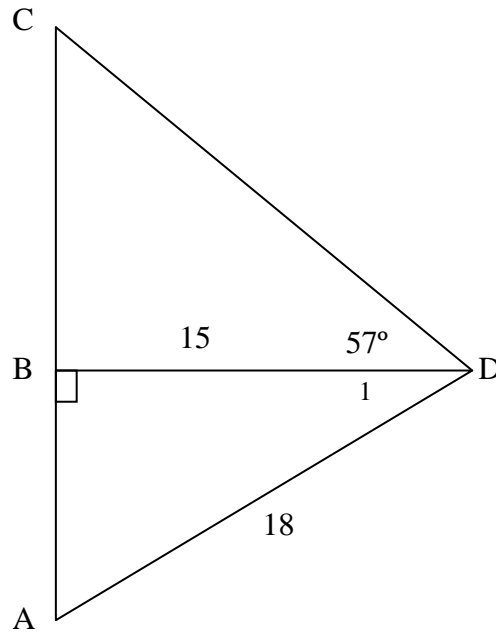


- 4.2.1 Calculate  $y$ . (3)
- 4.2.2 Calculate  $x$ . (3)

**[13]**

**QUESTION 5**

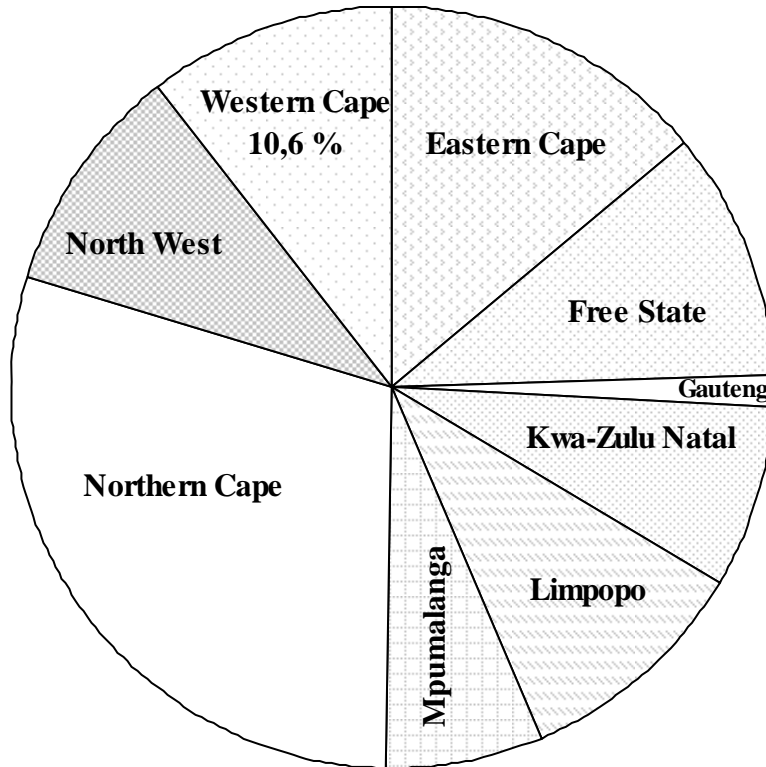
In the diagram below the angle of elevation of C from D is  $57^\circ$ .  $AD = 18$  cm and  $BD = 15$  cm.



- 5.1 Calculate  $\hat{D}_1$  (3)
- 5.2 Calculate the length of AB. (3)
- 5.3 Calculate the length of AC. (4)
- [10]**

**QUESTION 6**

The pie chart represents the area (in  $\text{km}^2$ ) of the provinces of South Africa. The total land occupied by South Africa is  $1\,219\,090\text{ km}^2$ .



- 6.1 Calculate the area, in  $\text{km}^2$ , of the Western Cape. (2)
- 6.2 If the Eastern Cape covers  $169\,580\text{ km}^2$ , calculate the percentage of land that the Eastern Cape occupies in South Africa. (3)
- 6.3 Calculate the number of degrees KwaZulu-Natal occupies in the pie chart if KwaZulu-Natal has an area of  $92\,100\text{ km}^2$ . (3)

**[8]**



**QUESTION 7**

The heights of 22 learners were measured and recorded as shown below:

152	162	145	170	172	156	163	147
156	148	168	174	169	158	165	164
153	159	166	167	165	156		

7.1 Complete the frequency table on the attached diagram sheet. (4)

Heights, $h$ , in centimetres	Frequency
$140 \leq h < 150$	
$150 \leq h < 160$	
$160 \leq h < 170$	
$170 \leq h < 180$	

7.2 Draw the histogram that best represents the frequency table in QUESTION 7.1. (6)

7.3 Write down the modal class. (1)

7.4 Determine the percentage of learners that are taller than 160 cm. (2)

7.5 Is the mode a fair reflection of the data? Explain your answer. (2)

[15]

**QUESTION 8**

8.1 A farmer in the Free State has 32 cattle to sell. Their weights in kilograms (kg) are:

81	81	82	82	83	84	84	85
85	86	86	87	87	88	89	90
92	92	93	94	96	150	152	153
154	320	370	375	376	380	381	390

Consider the above data and determine:

8.1.1 The mean weight of the cattle (3)

8.1.2 The median weight of the cattle (2)

8.1.3 The range (1)

8.2 The farmer describes the cattle to a potential buyer by indicating that 'they weigh roughly 157 kg each'.

Which measure of central tendency has the farmer used to describe his cattle?  
Does this measure describe the cattle fairly? Explain your answer.

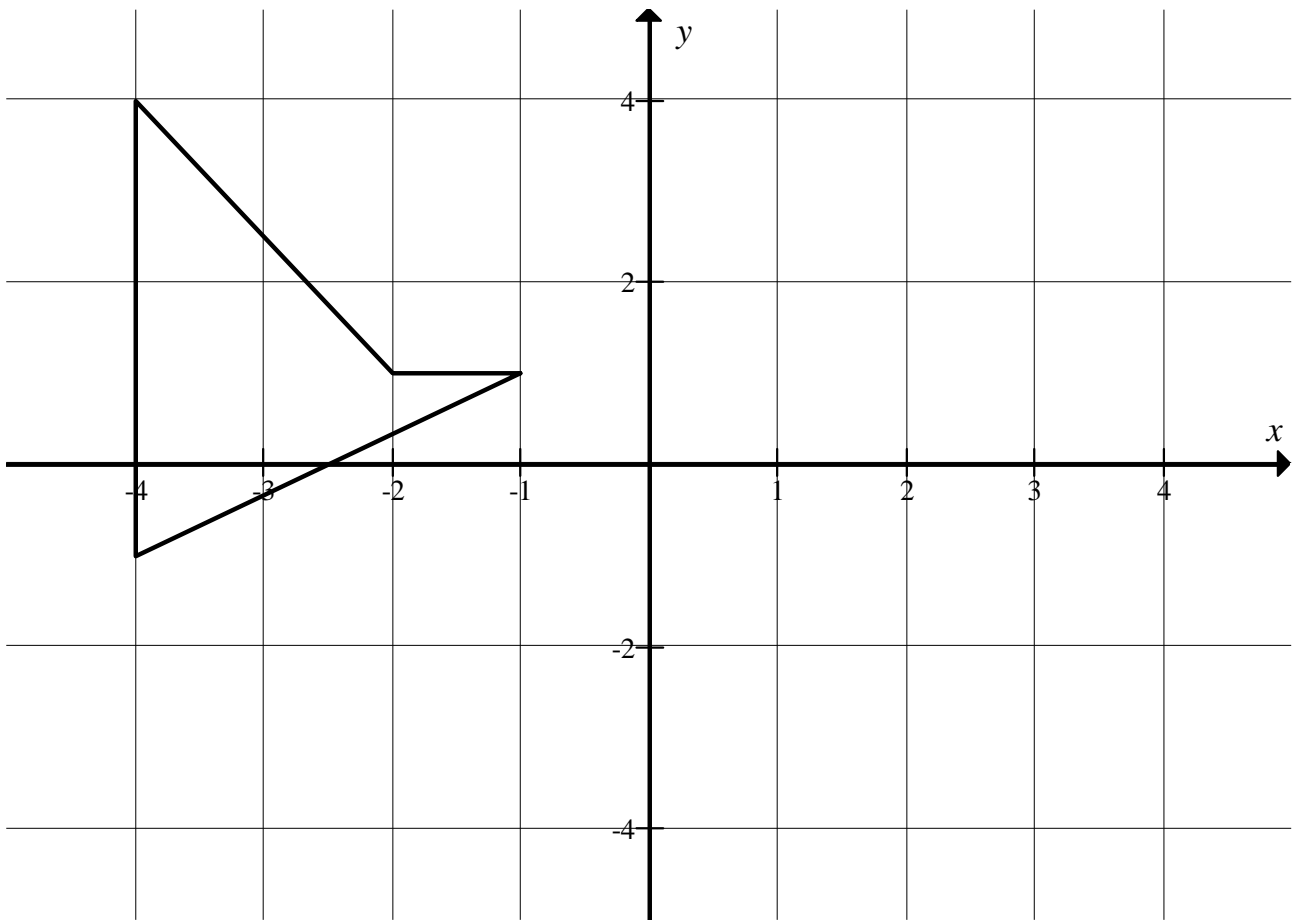
(3)

[9]

**TOTAL: 100**

**DIAGRAM SHEET**

**QUESTION 3.2**



**QUESTION 7.2**

Heights, $h$ , in centimetres	Frequency
$140 \leq h < 150$	
$150 \leq h < 160$	
$160 \leq h < 170$	
$170 \leq h < 180$	